

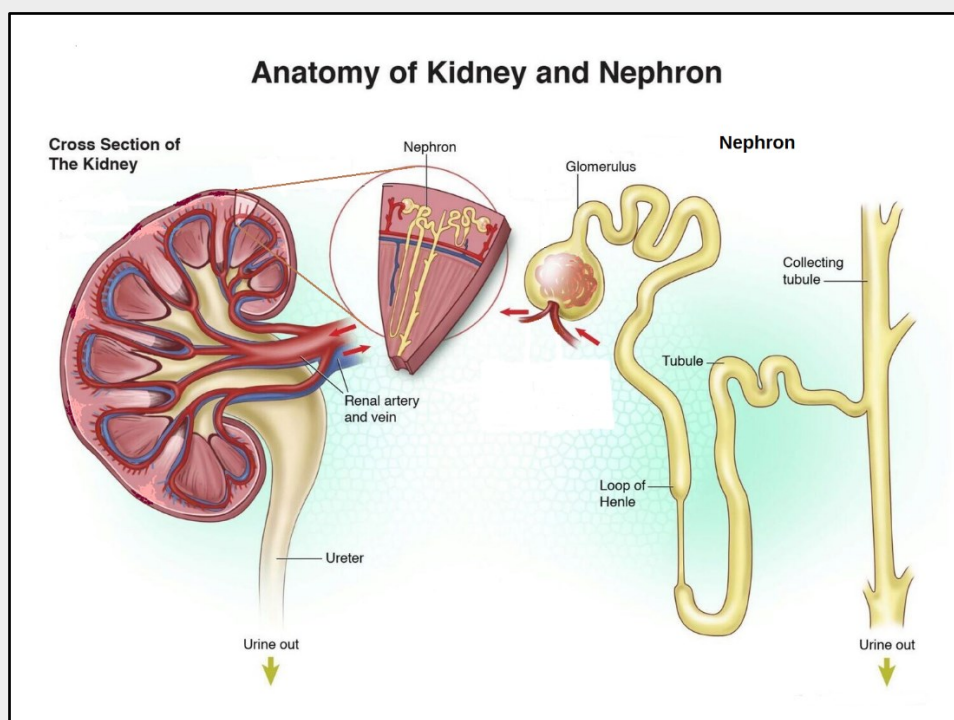


Chronic Kidney Disease in Cats

What is the kidney and how does it work?

The kidneys are hugely important organs responsible for a variety of essential functions within the body. Of course, the most obvious is the removal of waste products via the production of urine. However, the kidney also regulates several body minerals including calcium, potassium and sodium, affects blood volume and pressure via the conservation of water, and stimulates the production and growth of red blood cells.

The kidney is made up of several different structures. The functional unit of the kidney is called the nephron, and this consists of thousands of networks of tiny blood vessels called glomeruli, which attach to a series of collecting tubules. Blood flows into the kidneys through a large blood vessel called the renal artery, then into the glomeruli, and from there to the renal tubules where important components of the blood (including water, sodium, and other nutrients) are resorbed into the blood stream, and waste products including urea, creatinine and excess fluid combine to form urine. After passing through the glomeruli, the filtered blood returns to the bloodstream through a large blood vessel called the renal vein. Urine then flows from the kidney to the bladder through muscular tubes called ureters.



What is Chronic Kidney Disease?

Chronic Kidney Disease (CKD) is a very common condition of older cats, affecting 30-40% of cats aged 10 years and over, and around 80% of cats older than 15, making it an almost 'normal' finding in geriatric cats. The degree of kidney function that remains when cats are first diagnosed varies significantly, and for many cats, other diseases or issues will result in their deaths before their kidney disease becomes significant.

The kidney has significant reserve function, and therefore around 75% of the kidney's nephrons must be damaged before we are able to detect reduced kidney function on blood tests. While kidney damage can occur suddenly for various reasons (Acute Kidney Injury, AKI), in most cases the kidneys have been slowly deteriorating over time as a result of age related changes and various other effects over the years, resulting in a long term, or chronic, disease state (Chronic Kidney Disease, CKD).

Because the kidney filters toxic waste products from the blood, reduced kidney function results in these toxins building up in the body, leading to various negative outcomes including reduced gastrointestinal function, altered energy utilisation, and even brain damage. Increased levels of certain minerals such as phosphorous can lead to weakened bones, which may result in fractures.

How does it affect my pet?

Signs seen at home will become more obvious the longer the disease progresses. Increased drinking, increased urination and dilute urine are the most obvious signs. In later stages of the disease, cats will become lethargic, have a reduced appetite, weight loss, and a poor coat. Cats suffering from end stage CKD will be very thin, weak, have terrible breath, and will eat very little but drink vast amounts of water.

Sadly, CKD is a slowly progressive condition, and is eventually fatal over time. While treatment can certainly improve quality of life and extend the life expectancy of cats with CKD, there is no cure.

How is CKD diagnosed?

If your middle aged to older cat presents with the signs above, our vets will have a high suspicion of CKD. Ultimately however, the disease is diagnosed via blood and urine tests.

Because the kidney is responsible for filtering waste products and either excreting them in urine or resorbing them into the blood stream, unusually low or unusually high levels of certain substances can indicate that the kidney is no longer effectively filtering the blood.

The two most important blood markers of kidney disease are **blood urea nitrogen** or **BUN** (a waste product from the breakdown of dietary protein), and **creatinine** or **CREA** (from the breakdown of muscle tissue). These substances naturally occur in the blood at low levels, however when the kidneys are not functioning normally these levels become elevated and serve as markers of kidney disease.

Unfortunately, the levels of these do not rise until around 75% of function is lost, meaning elevations seen on blood tests are usually indicative of late stage disease.

In addition, in cats with CKD we can expect that **phosphorous (PHOS)** and **calcium (CA)** are likely to be increased, potassium may be decreased, red blood cell numbers will be decreased (anaemia), there will be increased levels of protein in the urine, and the urine will be very dilute.

Many cats diagnosed with CKD also have hyperthyroidism, and these two age-related conditions are often found together. In many cases the two are not related, however, hyperthyroidism *can* cause kidney disease, and clinical signs of both these conditions are very similar. It is possible that CKD will not be apparent on blood tests until after hyperthyroidism has been stabilised with treatment.

BUN	63.7 *	2.5-8.9	mmol/L
CA	3.54 *	2.15-2.95	mmol/L
PHOS	5.59 *	0.94-2.13	mmol/L
CRE	742 *	27-124	umol/L

Blood test results from a patient with late stage CKD showing elevated levels of blood urea nitrogen, creatinine, calcium, and phosphorous.

What can we do about it?

Sadly, once the kidneys are slowly damaged in this way, we cannot reverse this damage. If the kidneys have suffered from an acute episode due to a toxic insult or infection, it may be possible to treat the cat so that they recover normal kidney function, however, some physical damage will be permanent.

There are options for managing CKD in order to keep your cat happier for longer. Several therapies are available to help your cat.

Prescription diets. Specially formulated diets that are low in protein and phosphorus help lower the level of toxic waste products in the blood. Of all the available treatments, diet has been shown to be the most effective in slowing the progression of CKD.



Potassium supplementation and phosphate binders. Kidney disease can lead to lowered blood potassium which leads to weakness and muscle stiffness. Phosphorous is often high in cats with CKD, which can lead to an imbalance of calcium resulting in the body drawing calcium from the skeleton, leading to reduced bone density and weakened bones. Both low potassium and high phosphorous can also lead to the worsening of kidney disease.

B Vitamins. Dilute urine takes with it many water-soluble vitamins such as B12 (cobalamin). Supplementation with this vitamin will help to reduce the effect that deficiency has on red blood cell formation, DNS synthesis and nerve cell function.

Appetite stimulants and pain relief. Due to oral and/or stomach ulceration, and the effects of toxin buildup, cats with CKD will often feel reluctant to eat. As most cats with CKD are elderly, they may also be suffering from dental disease and pain. Therefore controlling their mouth pain is important and encouraging them to eat is a big part of managing their disease. The kidneys are responsible for assisting in the metabolism and excretion of medications, so it is extremely important that vets carefully choose the most effective and safest medications for your cat.

Anti-emetics. Many cats will feel nauseated from the circulating toxins that the failing kidneys can not get rid of. Anti-nausea medications (anti-emetics) may help these cats feel better, and thereby encourage their appetite.

Anti-hypertensives. High blood pressure is common in cats with CKD. This in turn can lead to further kidney damage, and injury to other organs such as the eye and

brain. Medications to help lower blood pressure may be prescribed for cats with CKD.

Subcutaneous (SQ) fluids. As the disease progresses, the kidneys produce urine that is more and more dilute, resulting in huge fluid losses from the body. Cats will become significantly dehydrated, and in the later stages of the disease will find it difficult to drink enough to maintain their hydration. Dehydration will further reduce kidney function and has a huge effect on well being. Cats (and humans!) who are significantly dehydrated are known to feel pretty awful. SQ fluids can greatly improve your cat's quality of life. These are administered using a sterile balanced fluid solution, and are given with a needle placed under the skin. This can be done regularly in the clinic, but many owners prefer to do this themselves at home. Our staff can show you how to do this.

Can I choose not to treat my cat's CKD?

As CKD can not be cured but it can be managed, it is not unreasonable to elect not to pursue any of the therapies above. However, it is essential to understand that cats with CKD feel quite unwell, and most therapies are aimed at improving their quality of life. Symptomatic treatment of nausea, oral pain, and dehydration is considered to be the minimum standard of care for cats with CKD. Sadly, for cats with late stage kidney disease, euthanasia is often the kindest option.

Can it be prevented?

Unfortunately, ultimately CKD cannot be prevented. However, by minimising anaesthetic events where possible, avoiding the feeding of diets high in salt and protein, and preventing toxin ingestion, we can reduce the incidence of Acute Kidney Injury which can hasten the deterioration of kidney function.

What are the costs involved in treatment?

Initial detection of kidney disease requires a consultation with our vets. They will start with a physical exam, and then recommend comprehensive blood work and urinalysis. The cost of this initial visit is around \$450 at The Vet Clinic.

Regular blood and urine tests to monitor kidney levels are around \$250, including consultation with our vets to discuss your cat's progress and blood results.

Depending on your cat's general health and individual response to therapy, these tests may be recommended every 3 to 6 months.

Cost of therapy varies depending on treatments chosen, but may be around \$60-\$100 per month for a specialised renal diet. Medications differ significantly in cost, and not all cats will require all of the available medications. Medicines to control blood pressure work out to around \$100 per month and vitamin and mineral

supplements may be around \$135 per month. Medications to control nausea and stimulate appetite may cost approximately \$100 per month depending how frequently they may be required, and you can expect subcutaneous fluids administered weekly at the clinic to come to around \$150 per month.

Is there anything I can do at home?

Following our vet's recommendations tailored to your individual cat is the most important thing you can do to ensure your pet remains as comfortable as possible for as long as possible. Ensuring the availability of plenty of clean, fresh, cool water is essential.

Recognising when your cat may be suffering from complications such as severe dehydration, nausea, pain, or constipation is important. Being able to treat and manage these concerns quickly will greatly improve and lengthen your cat's quality of life.

How can I get more information?

If you would like to find out more about chronic kidney disease, please feel free to contact the clinic any time to have a chat with our friendly team. If you think your cat may be suffering from kidney disease, the best thing to do is to make an appointment with one of our vets for a full consultation and physical exam of your cat. We can work with you to develop the best diagnostic and treatment plan for you and your friend going forward.

To make an appointment, simply contact The Vet Clinic on 8564 3488 to speak with one of our knowledgeable and friendly nurses.